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Title: Development of a High Exposure Underwater Solar UV Dosimeter

Category: Environmental Physics.

Abstract:

The penetration and distribution of the Solar Ultraviolet Radiation (UV) field in any natural underwater environment depends on the column depth and dissolved organic carbon (DOC) level of the water, and therefore the capability of the UV to cause biological damage to the aquatic biota is also dependent upon these parameters. Several solid-state chemical dosimeters have been fabricated and tested to measure the underwater UV, and in turn quantify the relationship between water column depth and DOC levels to the underwater UV field distribution. However, these dosimeters have only had the ability to measure UV exposures over short temporal increments, thus limiting the scope of the data.

It has now become necessary to build upon this initial research and develop a chemical dosimeter that is capable of measuring long-term UV exposure in any type of underwater environment. Poly (2,6-dimethyl-1, 4-phenylene oxide) (PPO) has been identified and selected as a prime candidate for this objective. The optical properties of PPO have already been tested in air. However, before being deployed for trials in actual marine environments, the immersed optical properties of the PPO dosimeter have to be tested in a controlled laboratory environment using solar simulation techniques in order to confirm the suitability of PPO for this purpose. The optical properties that have been investigated to date include the dose response, spectral response, angular variation and dark reaction. In addition to this, the effects of the attachment of a neutral density filter (NDF) to the PPO dosimeter and its subsequent optical properties have been examined in detail.

This presentation will deliver these results and will also discuss the future directions that this research will take.